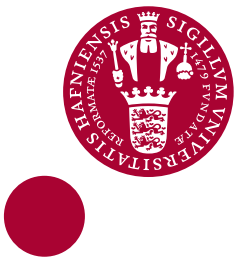

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The Collateral Liquidity Problem in Contemporary Finance and the Resurrection of Quantity Theory

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Abstract

Since the 2008 crisis, the liquidity of collateral has become a serious concern for financial market institutions and regulators due to its increased importance in risk and cash flow management. Surprisingly, market participants mobilise old-fashioned economic theory, such as Irving Fisher's quantity theory of money in their discussions of how to deal with the new problems of collateral liquidity. Today, 'collateral is the new cash', as one sector report claims, marking a shift from a quantity theory of money to one of collateral. Liquidity, I argue, poses not only practical problems to market participants and regulators, but also epistemic ones. Accordingly, practitioners not only produce practical but also theoretical responses to it, mobilizing classical economic theory in so doing. The problem of liquidity is shown to relate closely to a problem of 'sovereignty' in the narrow sense of guaranteeing the safe value of collateral. Contrary to established conceptions, sovereignty in this sense is not limited to states, but can also occur with monopolistic agents in the market such as global custodians. Thus, following the recent decade of crisis, general epistemic problems of liquidity and sovereignty in contemporary finance become visible through the practical problems and solutions in relation to collateral – specifically in the practical problems of buttressing liquidity in its double nature of collateral velocity and quality or safety.

Keywords: Financial markets, liquidity, collateral, economic theory, European Union, Target2 Securities (T2S)

1. Introduction

With ongoing globalization and a surge in regulation following the 2008 financial crisis, collateralization – whereby security is pledged against a loan as a guarantee for the creditor in case of default – has assumed an increasingly important role, not only in financial market risk management, but also for government debt management and debt flows in financial markets (Braun and Hübner, 2018; Engelen and Glasmacher, 2018; Gabor, 2016; Gabor and Vestergaard, 2018; see Preunkert, 2017; Riles, 2011; Sweeney, 2017). In particular, the surge in the use of instruments such as 'repo lending' (collateralized borrowing through which banks manage liquidity) and derivatives (which are now generally subject to high collateral requirements in order to reduce systemic risk) has produced an increased focus on collateral and its role in financial markets (Gabor, 2016; Riles, 2010, 2011). While researchers have invested greatly in understanding these developments, less attention has been paid to how they also face financial practitioners with epistemic uncertainties that require new reflection and new responses. Both market agents and regulators have begun to discuss issues related to the quantity and liquidity of the eligible collateral available in the market (Clearstream and PWC, 2013; Fender and Lewrick, 2013; ICMA, 2012; ICMA-ERC, 2014; Singh, 2013, 2015). The European Commission's (2015) recent Green Paper on a 'Capital Markets Union' bears clear traces of this debate (see also Braun and Hübner, 2018; Engelen and Glasmacher, 2018). Examining these discussions, the article shows that, puzzlingly, monetarist 'quantity theory' – a macroeconomic theory otherwise abandoned by academic economists and central bankers alike – has re-emerged in financial market practice, not in relation to monetary creation, but rather to collateral, its creation and its circulation. The article asks why and how this theory has re-emerged within financial markets since 2008 and argues that it responds to the new role of collateral in assuring liquidity in financial markets. The closer analysis leads to the identification of clear traces of further economic theories in contemporary financial practice – notably Keynesian and modern finance theories. Yet, where

existing approaches to the epistemic role of economic theories in markets have thought of theories as either coherent, instrumental, and/or socio-technologically developing entities, the present article emphasises the co-existence of different and even contradicting theories *in relation to* a common problem (see also Krarup, 2019a, 2019b). For example, Seabrooke and Tsingou (2014) focus on how different expert groups promote different policy ideas based on their distinct professional knowledge in relation to financial regulation; with her concept of epistemic culture, Knorr-Cetina (1999: 9) focused on the 'machineries of knowing' as the important feature tying together a knowledge domain; MacKenzie (2006) and Callon (1998) have focused on the performative effects of specific economic theories in constructing markets in their image; Mirowski (2009) has thought of neoliberalism as a 'thought collective' more or less loosely organized around a number of main tenets. But the analysis here will have a somewhat different focus: how a certain problem of economic theory – across its different specific variants as a more or less stable palette of responses to that problem – continues to re-emerge in contemporary finance, namely the problem of liquidity. In other words, it is the common determination of an epistemic problem, not the specific responses (theories) that are the main focus here.

The problem of liquidity in financial markets occurs because the asset that guarantees liquidity – money, collateral – must simultaneously be scarce and restricted by quality concerns in order to guarantee safe value. In other words, liquidity is Janus-faced, as it relies on a commodity of a fixed quantity (money, collateral), but at the same time on infinite availability (credit, repo). In the quantity theory terminology, 'liquidity' is not *only* the 'velocity' of a scarce asset in market transactions here and now, but *also* the 'security' or guarantee that the asset can always be sold in the market at a stable price in the future. Liquidity is a paradox, ideally demanding the infinite exchangeability of a finite quantity of assets – but a necessary paradox to economic theory in academia and financial practice alike. Monetarist theory has re-emerged in relation to collateral, I argue, because a number of

developments have pushed towards the scarce-commodity pole of this contradiction since 2008, following the seemingly ever-expanding credit and liquidity during the prior two decades of the 'great moderation' in business cycle volatility (see Braun, 2014). But the transposition of quantity theory from money to collateral also reveals its close relation to problems of risk and what I term 'sovereignty' understood as the capacity to guarantee liquidity within a more or less closed market space. Economic theory may be of help here, but not as individual theories, I argue. Economic theory is founded on an epistemic commitment of non-contradiction. As a consequence, the contradictions of liquidity are reflected in the *opposition* between different and even opposing economic theories, each conceptualizing different aspects of liquidity. This, I argue, is why old quantity theory can re-emerge despite its well-known fallacies: It helps account for and deal with *one* aspect of liquidity that has become increasingly pressing since 2008.

Given that collateral in contemporary finance is itself a credit instrument (bond) pledged as a guarantee against another credit instrument, both of which are traded as 'commodities' in the market, we may accentuate this contradiction as follows: as security, collateral must be a perfectly liquid, stably-priced, and riskless *credit* commodity, while as a credit *commodity*, collateral must be scarce, price-fluctuating according to supply and demand, and remunerated according to its risk profile. Liquidity, I argue, is the concept supposed to mediate between the two. This relates to the new ways that state and market interlace around the concept of collateral in contemporary finance. Liquidity requires what I call a 'sovereign' agent, not entirely synonymous with the state, to provide the liquidity guarantee, being simultaneously a player in the market and setting the framework of the market. Quasi-monopolistic global custodian banks are examples of non-state 'sovereign' agents in this sense. In this way, the problem of liquidity is traced across the concepts of money, collateral, risk, and sovereignty.

In the article, I deliberately leave out of consideration the strategic and political power struggles within which the problem of collateral liquidity has emerged and quantity theory resurrected. Indeed, the main actors here are powerful lobby organizations, international banks, and European government bodies – all of which are engaged in a number of major projects and negotiations around continued European financial market integration (Krarup, 2019a). These power struggles are the main focus of the majority of contributions to the political economy of contemporary finance. By contrast, the focus on epistemic problems in the present article is in all modesty new and merits thorough treatment. Certainly, the lobby organizations of international banks have an interest in promoting arguments in favour of more lax regulation of capital and the European Commission can turn the same arguments in favour of renewed market integration efforts. But we would still want to know what problems these political struggles are structured by and how. Crucially, these structures will most likely tell us nothing about who wins in the political struggles (questions of power), but they may illuminate the playing field and the rules of the game when it comes to making knowledge claims and expertise arguments in those struggles (epistemic questions).

The research materials mobilized in the article are drawn from a bigger research project on European financial market integration (Krarup, 2019a) and focused on – but not restricted to – a major project by the European Central Bank (ECB) to create a new pan-European infrastructure for financial markets called Target2 Securities (T2S). One of the qualities ofT2S mentioned by a number of interviewees and documents was its effects on 'collateral fluidity', which is the focus of the article. The research materials comprise three sources related to T2S. First, 59 interviews conducted mainly in 2014–2015 in France, Germany, Denmark and Belgium with 72 persons from European central banks, financial infrastructure providers, private banks and regulatory authorities, including the ECB and the European Commission. Second, sector reports, legislation and other documents. Finally, selected classics of economic theory, which were consulted in order to further explore and analyse

the apparent economic character of discussions, were identified in the first two materials. In particular, for the purposes of the analysis presented in this article, a number of classic theories of money and finance were consulted, including monetarist, Keynesian and post-Keynesian, financial, neoclassical and Austrian theories.

The following section provides more detailed background information about collateral and quantity theory. The third section accounts for the recent formation of a collateral problem in finance. The fourth section examines the slogan that 'collateral is the new cash' and the quantity theory behind it. The fifth section identifies the paradoxical need for a 'sovereign' to guarantee liquidity in contemporary finance. The sixth section discusses the analysis in light of economic theory and modern finance theory. The final section concludes and discusses perspectives for a new research agenda on the role of economic theory in contemporary finance.

2. The Background: What is Collateral and What is Quantity Theory?

Simply put, collateral is security placed by debtors with creditors as a guarantee on a loan: if the debtor defaults the creditor obtains ownership of the collateral. Since the financial crisis, regulators have strongly increased requirements for collateral use as a means to enhance systemic stability in financial markets.[1] However, collateral poses a problem to the extent that it makes financial assets 'lie dead', potentially impinging on efficiency, liquidity and credit creation. Market participants and others have also raised concerns about 'the quantity of collateral' – whether enough high-quality collateral is available in markets to meet regulatory demands and to ensure market liquidity (credit creation) (Clearstream and PWC, 2013; European Commission, 2015; Fender and Lewrick, 2013; ICMA, 2012; ICMA-ERC, 2014; Singh, 2013, 2015). At the same time, new market infrastructure technologies allowing collateral to be re-used and exchanged more freely have given rise to the idea

that ‘collateral is the new cash’ (ICMA-ERC, 2014). As the analysis will show, it is within this context that the monetarist quantity theory has risen again, albeit in a new guise.

Quantity theory builds on the idea of a simple relationship between the aggregates of quantity, velocity (or liquidity, fluidity), price and transaction volumes of the most liquid asset (money). Based on the famous monetarist formula $MV=PT$, the quantity theory of money of Irving Fisher and later Milton Friedman stipulates a direct long-run causal impact of the money supply M on the price level P (‘inflation’) because the transaction volumes T and the velocity of money V (the aggregate number of times a money asset ‘changes hands’ within a given period of time) are assumed to be stable. Not only did the theory become influential among academic economists in the 1970s, it was also for some time the official policy of a number of major central banks in the world, but has since gone out of fashion again, at least in its pure form. In the 1990s and 2000s the hitherto stable aggregate relationship between M and P seemed to have disappeared (Federal Reserve Bank of New York, 2008). It has been questioned whether central bankers actually ever believed in the theory or rather used it as a rhetorical device to legitimize their policies (Braun, 2016). Even at the heyday of monetarism – during the ‘Volcker shock’ imposed by the Chairman of the Federal Reserve in 1979 – monetary policy seems to not have been guided by money-supply targeting (Krippner, 2012: 121). More recently, the Bank of England (2014) has explained publicly that it does not control inflation and interest rates by setting the quantity of money, M. Banks create money when they make loans, while central banks ease access to reserves when liquidity needs in markets push interest rates away from the policy level. As one central banker explained to me, this means that central banks passively adjust M to the liquidity demand of banks on a continuous basis in order to manipulate the interest rate towards the policy level. Credit was allowed to expand and new credit instruments to proliferate as long as consumer price inflation remained (or appeared to be) under control during the ‘great moderation’ in the 2000s because financial markets were said to efficiently align the risk and price

of assets (Braun, 2015). Some have argued that the paradigm that has replaced monetarism – 'new Keynesian economics' – is in fact permeated by fundamental monetarist tenets, even if only 'a few eddies' today are declared monetarists (de Long, 2000). Rhetorical or substantial, the going out of fashion of quantity theory has been clear.

3. The Materials and their Treatment

The materials are drawn from a bigger research project on European financial market integration (Krarup, 2019a), focused on – but not restricted to – a major project by the European Central Bank (ECB) to create a new pan-European infrastructure for financial markets called Target2 Securities (T2S). One of the qualities of T2S mentioned by a number of interviewees and documents was its effects on 'collateral fluidity', which is the focus of the article.

The materials gathered for the research project comprises three sources related to T2S. Firstly, 59 interviews conducted mainly in 2014-2015 in France, Germany, Denmark, and Belgium with 72 persons from European central banks, financial infrastructure providers, private banks, and regulatory authorities, including the European Central Bank (ECB) and the European Commission. Secondly, sector reports, legislation, and other documents. Finally, selected classics of economic theory, which were consulted in order to further explore and analyse the apparent economic character of discussions identified in the first two materials. In particular, for the purposes of the analysis presented in this article, a number of classic theories of money and finance were consulted, including monetarist, Keynesian and post-Keynesian, financial, neoclassical, and Austrian theories.

4. The Formation of a Collateral Problem in Finance

In order to guarantee anything, collateral must be 'safe' assets. 'High-quality liquid' and 'high quality' assets in the nomenclature of the Basel III regulation perform the collateral function for

virtually the entire market (ICMA-ERC, 2014). These are generally government bonds, since stocks are more price volatile and commercial bonds more risky. Moreover, the 'haircuts' that collateral takers apply in order to protect themselves against price volatility easily go through the roof for assets that have not received top credit rating, while important collateral takers, such as central banks, flatly deny accepting them altogether.[2]

But the 'safety' function of collateral means that corrections must be performed throughout the life-time of the credit obligation depending on fluctuations in the value and risk profile of the collateralized asset in the market. The so-called mark-to-market standard means that, on a frequent basis and depending on the direction of price changes in the asset, the debtor will receive collateral back or be called to pledge more collateral. The valuation of collateral reveals its inherent contradictions. Riles (2010: 800) observes that the concept of collateral rests on a fiction because it has one leg in perfectly efficient markets and another leg in a market structure of qualitative differences and arbitrage possibilities. Millo *et al.* (2005) likewise observe that collateral serves two contradictory functions: it must be an intrinsically valuable asset that can secure a 'bureaucratic' realm of settlement from market risks, while it must constantly be valued in the market. The problem of valuation is due to the double role of collateral as being, at once, security against market risk and as commodity that can at any time be sold in the market.

The traditional collateralisation technique is the 'pledge' where an asset in the debtor's portfolio is flagged so that it cannot be sold but legally remains the possession of the debtor. Today, by contrast, collateral in the short-term liquidity management of big, highly leveraged financial institutions is 'repos'. Repo is an abbreviation of 'repurchase agreement,' meaning that the collateralised loan is in fact legally a sale of securities with an obligation to buy them back at a future date at a pre-set price (calculated as an interest rate). This means that the collateral can be sold on to a third party or used as collateral by the creditor in the meantime – the only obligation is to deliver back equivalent

collateral when the loan is redeemed. This is called collateral re-use or rehypothecation. Repos are also used by many central banks in their monetary policy and since the 1990s the use of repos in markets has been facilitated by technical innovations, Basel regulation, and ICMA harmonisation, while repos have also increased in popularity as a way to circumvent capital requirements and other regulation related to traditional loans with pledged collateral (see Garbade, 2006; ICMA, 2011; Riles, 2011: 170).

Collateral re-use became infamous during the financial crisis because defaults, downgrades, and plunging asset prices inflicted chaos in the long and intransparent chains of bilateral collateral obligations. The repo system has been characterized as pro-cyclical and criticized as one of the causes of the 2008 financial crisis: When security prices fall due to a chock in the market, pressure increases on financial institutions to meet their collateral obligations in the short-term repo funding market, leading to fire-sales that further contribute to price falls (Gabor, 2016; Gorton and Metrick, 2012; Mehrling et al., 2015; Pozsar et al., 2013; Stein, 2015). In other words, even if financial institutions could still sell their collateral assets and hence uphold their simple 'velocity' (V), plunging prizes (P) would still undermine their function as security and hence their 'liquidity'. Yet, collateral continues to be promoted by regulation and serves in relation to all kinds of outstanding obligations – manifest or potential. Besides repos, it is used notably in derivatives contracts, such as interest-rate or foreign-exchange swaps. It is a 'core element of private market self-regulation' (Riles, 2011: 159) as well as for monetary policy implementation and in ensuring that central banks do not take any 'market risk'.

Before the financial crisis of 2008, overnight and short-term lending between banks to a larger extent took place in the 'money market' on a 'blanco' basis – that is, with no collateral as security against the credit. However, during the financial crisis the unsecured money market 'froze up' and has hardly recovered since. An ECB economist reports that in 2012 'about 80% of short-term interbank lending was secured compared to 60-65% in 2007' (Terol, 2013: 9). European banks in

particular still do not trust each others as debtors, so collateral serves as a guarantor. One sector report therefore states that 'collateral management has become inseparable from liquidity management and risk management. In the modern financial and economic context, these are essentially the same thing' (ICMA-ERC, 2014: 5).

The optimisation of collateral management has become important for the individual financial institution, while for the financial market as a whole the supply and liquidity of collateral has become an issue of concern. With rising regulatory requirements and the prevalence of the 'austerity' view that governments should reduce their debt burden (hence removing high-quality collateral from markets), market agents have begun raising questions such as the following: Will there be collateral shortages in the future? Can more optimised collateral use contribute to the prevention of shortages and reduce costs? How will market stress and crisis affect the price and liquidity of collateral? (Clearstream and PWC, 2013; European Commission, 2015; Fender and Lewrick, 2013; ICMA, 2012; ICMA-ERC, 2014; Singh, 2013, 2015). It is within this context that quantity theory has re-emerged.

5. 'Collateral is the New Cash'

The ECB's implementation of T2S – a new pan-European financial infrastructure – between 2015 and 2017 has attracted the attention of the sector. According to the European Commission (2015: 22–23), T2S is an essential prerequisite to the ongoing projects for renewed financial market integration (see Epstein and Rhodes, 2018). T2S will ideally allow banks to pool their European settlement accounts for securities transactions, putting an end to the previous fragmentation amongst 20+ national and regional settlement systems with each its liquidity buffer and legal framework. In this context, the custody industry has begun to explore new business opportunities (see Clearstream and PWC, 2013).

Global and regional custodian banks like Bank of New York Mellon, JP Morgan, BNP Paribas and Société Générale, along with two so-called international central securities depositories (ICSDs), Euroclear and Clearstream, provide services related to the settlement of financial transactions such as credit, collateral management, and securities lending. These services facilitate the smooth settlement of huge amounts of diverse transactions across different technical systems and national legal environments, optimising cash and collateral use (see ECB, 2007). While originally conceived to integrate the settlement of financial transactions in Europe, it is now realized that T2S may also make financial markets more liquid because it facilitates, harmonises, and optimises the process whereby securities as collateral can be turned into cash and *vice versa*. As one central banker puts it: 'If you see the liquidity of banks as a person running on two legs, a cash and a securities leg,' then the asymmetry in Europe before T2S between integrated central banking and payment systems, on the one hand, and fragmented settlement infrastructures, on the other hand, meant that 'the one leg [cash] can go at full speed and the other one [securities] can merely walk.'

The bipedal image of liquidity in the central banker's account is telling of its conceptual ambiguity: 'Liquidity' is often used synonymously with cash, but can also be broader and designate the marketability and collateralisability of any financial asset in return for cash. As implied by the central banker, while 'liquidity' is certainly 'one person', so to speak, it has 'two legs' – and they must move in perfect cadence for liquidity to run fast. The keyword here is exchangeability between assets. But exchangeability, too, has two sides: the capacity to engage in transactions at all times and the stability of valuation of the assets in those transactions (when prices plunge, as in 2008, liquidity has 'dried up' because even if the assets could still be sold it would no longer enable banks to meet their credit obligations). Indeed, while market participants often speak of the liquidity of a single asset, the underlying problem is liquidity as a stable relationship of fungibility between money and other financial assets.

Conforming to the image of liquidity as walking on the two legs of cash and collateral and with the auspicious prospects of T2S, one sector report published by the International Capital Market Association (ICMA) and the European Repo Council (ERC) contends that 'Collateral is the New Cash' (ICMA-ERC, 2014). With T2S, money and collateral in Europe is said to become extremely fungible, even cross-border, while collateral can be mobilised from anywhere in Europe to access central bank or private bank credit (see also Clearstream and PWC, 2013).

5.1. The Fluidity of Collateral and the Resurrection of Quantity Theory

To be sure, velocity and liquidity are not one and the same concept. Velocity does not contain the same contradictions as liquidity does, but can be calculated as a simple average. Yet, velocity makes up one side in the contradictory concept of liquidity, the other side being safe value or value guarantee, as we shall see in more detail in section 6. The tricky thing here is that practitioners sometimes use 'liquidity' to denote only one side of the contradiction, that is, as synonymous with velocity. To make matters even more confusing, market participants today often speak of the 'fluidity' of collateral – sometimes synonymous with velocity, sometimes with liquidity. In more technical contexts, the underlying concept, however, is clearly the same as velocity, as it refers to the average number of times an aggregate quantity of securities is used as collateral within a given period of time. The term 'fluidity' was used by several interviewees and can be found in the European Commission's recent green paper on 'Capital Markets Union' (European Commission, 2015: 23). The term is most likely inspired by another ICMA report entitled 'Collateral Fluidity,' which contends that 'it is widely perceived that demands for high-quality collateral will significantly outstrip supply' in the future, and that therefore 'it is essential that efforts be made to ensure that collateral is able to flow as efficiently as possible' (ICMA, 2012: 1). The 'Collateral is the New Cash' report adds that both the supply and the fluidity of collateral becomes particularly important in times of market stress or crisis 'when

demand-supply imbalances are likely to be accentuated' (ICMA-ERC, 2014: 10). According to this report, 'equilibrium' between supply and demand for collateral can be represented by paraphrasing the central formula of quantity theory (section 2):

> *Demand for collateral = Effective supply of collateral x Collateral fluidity* (ICMA-ERC, 2014: 10).[3]

The equation is inspired by International Monetary Fund (IMF) economist Mammohan Singh (2013, see also 2015), who assesses trends in the 'velocity' or 're-use' of collateral. Note how the equation corresponds to Irving Fisher's (2009) 'quantity theory of money,' according to which $MV=PT$. On the left-hand side of the Fisher equation, the *availability* of money can be decomposed into the supply of a given quantity of money M multiplied by its velocity (the number of times it is re-used in a given time period) V; on the right-hand side, the *use* of money can be decomposed into the demand to settle a given number of transactions T and the average price per transaction P. Now re-consider the collateral equation above: The right-hand side is clearly equivalent to Fisher's quantity of money M multiplied by the velocity of money in circulation V, while the left-hand side could easily be decomposed into factors corresponding to Fisher's number of transactions T and average price level P.[4] We may, therefore, refer to the equation as the 'quantity theory of collateral.'

While the Fisher equation in itself in both cases is said to be nothing but a tautology, it has served as support for two kinds of theories about the causal relationship: 1) mainly from MV to PT because the quantity of money and economic activity are seen as relatively stable ('exogenous money' in monetarist theory) or from PT to MV because money is constantly created and destroyed as credit in response to transaction needs ('endogenous money' in post-Keynesian theory). Likewise, there is no causal relationship implied by the quantity of collateral equation in itself. Yet, the concern is clearly

with how scarcity *of high-quality collateral* makes increasing collateral fluidity the only plausible way out of *liquidity* pressures – encompassing both velocity *and* security. If collateral fluidity does not go up, collateral demands may not be met in the future, or so the report suggests. In other words, the number of financial transactions will decrease, a decline in credit creation will follow and, possibly, economic activity eventually stagnate. While ICMA seems most concerned with the first steps, the European Commission seems to be concerned with the latter consequences, which is also officially the reason why it strongly pushes its capital market integration agenda more broadly (European Commission, 2015). As we shall see in section 6, the political concern for financial liquidity is not new, but the concern specifically with collateral liquidity in terms of quantity theory is. In other words, the quantity theory of collateral does imply more than a tautological equation, namely a set of causal relationships. There thus appears to be a parallel between the problems around the concept of money in economic theory and that of collateral in contemporary finance. Where monetarism was concerned with inflation due to extensive central bank credit creation, the quantity theory of collateral so far is concerned with the 'deflationary' pressures on collateral due to clotting of collateral fluidity and supply-demand imbalances. But the two subscribe to homologous conceptualizations of the problem of liquidity.

Rather than simply embracing the slogan that 'collateral is the new cash' as an adequate description of contemporary finance, I ask what has made the slogan emerge and how it is related to outdated economic theories. It is important to note that quantity theory is not about the quantity of money or collateral in itself, but the quantity *in relation to* its velocity or, more profoundly, its liquidity. Traditionally, economic theory describes money as a 'medium of exchange.' In economic theory, money is the most 'marketable' commodity and therefore takes on a new and special use value: its liquidity, that is, its capacity to buy. This means that upholding the liquidity and stable value of the money commodity becomes a prerequisite for efficient markets. As we have seen, collateral

can facilitate this because it secures debtors against default risk and thus eases credit-money creation. But to serve this purpose and to be universally transformable into money, collateral has to be *as* liquid and stable as money itself – that is, it, too, must be perfectly fungible and liquid. The interest of T2S as a market infrastructure is that it contributes precisely to that end. But the problem of liquidity extends far beyond T2S in contemporary finance.

5.2. The Beauty of Perfect Liquidity is that Nothing Moves

Having identified and unravelled the explicit manifestation of a quantity theory of collateral in contemporary finance, it is possible to follow it into areas where it has not been made explicit but is nonetheless latently identifiable in epistemic practices. Specifically, we may follow the need for collateral liquidity to other institutions and technologies that actually produce liquidity like the engines of modern finance and the innovations made around them, other than T2S. As mentioned in section 4, collateral re-use was heavily criticized in the wake of the financial crisis. 'There have been debates about stopping re-use completely,' one infrastructure provider explained to me. This is interesting because re-use is exactly what gives collateral its double character as both a liquid 'commodity' and a safeguard 'security,' and allows it to bridge between securities and cash. In fact, the 'fluidity' of collateral discussed in the previous section is defined precisely the extent of collateral re-use (ICMA-ERC, 2014: 10n).

According to some, the problem of intransparent chains concerns only bilateral repos. There is one alternative to the anonymous rehypothecation chains of bilateral 'over-the-counter' repos, which appears to overcome this immediate contradiction. In 'tri-party' repos, a major depository institution – in particular two global custodian banks (JP Morgan Chase, Bank of New York Mellon), two ICSDs (Euroclear and Clearstream), and some of the big national CSDs (see Duffie, 2015) – facilitate, oversee and manage the re-use of repos within their own accounting environments. In the tri-party

setup, both the taker and giver of collateral are clients with the depositary institution and both have securities and cash accounts with it. This means that chains of re-use are transparent to the provider, who can help unlock them if necessary and provide collateral management services, such as collateral substitution and lending, that further facilitates liquidity within the 'closed room' it offers. One triparty provider explains:

> If you think about collateral services being this room [in which the interview is taking place] at a certain point a piece of collateral comes in through this door and the door is closed. Then it may go from one collateral provider to a receiver, to another receiver etc., but all in this room, and it can never leave out the door unless it goes back to the original provider. That is kind of the re-use concept that we apply and which we can also apply across [our partners] because it is within one logic. So [the collateral] could go to Australia, but it is still considered to be in the same room, you are still in a closed system.

Similarly, in a more succinct formulation ending a long account of a triparty system, a former executive from a global custodian bank exclaimed: 'The beauty of the system is that you just do debit and credit between accounts on your platform. Nothing moves!'

The contradiction between collateral as security and as cash (i.e., as appearing on both sides of the quantity equation) thus appears to be overcome, as the liquidity turns absolute, unbound – a perfect 'medium' of exchange. However, upon closer inspection, the contradiction is rather transposed to another level, since perfect transparency and liquidity is only provided on the condition of the centralisation, if not monopolisation of 'the market' as such. The custody industry is highly specialised and strongly centralised on a few global and regional institutions. As of 2006, the biggest three custodian banks in the world – JP Morgan, Bank of New York and State Street – together held

approximately $37 tn. worth of assets under custody – almost the same total amount as the next 12 custodian banks, holding approximately $41 tn., the next 35 holding 'only' about $10 tn. in total (ECB, 2007: 14).

A new problematic concept thus emerges – that of market structure. The global custodian banks offer insulated spaces of strongly buttressed liquidity, but are able to do so only in so far as they create and monopolize that market space. Global custodian banks and other tri-party providers profit from their privileged position as the nodal points of transactions between financial institutions. Some institutions, such as pension and investment funds, sit on piles of high-quality assets, while others, such as broker-dealers and investment banks, seek to reduce their inventories to an absolute minimum, often ('short') selling assets they do not even possess yet. The funds may be restrained by regulation from investing in lower-class assets, while the banks may have troubles delivering on time – so they can sign a securities lending agreement with the tri-party provider that kicks in automatically when needed.[5] The global custodian, one interviewee explains, 'maintains and maximises the collateral use across all these counterparties, computes haircuts, valuates, calls in extra collateral when needed, substitutes and transforms the collateral, etc. All this you have to do in real time. It is massive!' The role of triparty providers as guarantors of liquidity through the production of fungibility between assets even goes as far as to define broad 'baskets' of collateral with specific risk profiles in which clients can trade instead of moving around specific assets. In the end, for collateral in its function as safety, 'risk profile' is all that matters. These baskets form the basis of extremely deep and liquid markets in collateral – more than the market in any one specific asset. Thus, via the concepts of liquidity and fungibility, within the closed space of the triparty system where 'nothing moves', financial assets (which are already debt instruments) are further abstracted into pure value and risk profiles. But, paradoxically, the removal of all frictions to liquidity and the perfect integration

of the market is itself a service provided *in* the market, not overcoming frictions to liquidity but transposing their structure.

According to economic theory, market structures such as these are 'monopolistic' (or possibly 'natural monopolies') due to the high 'fixed costs', 'network effects' and 'economies of scale' that just so happen to characterise financial custody and market infrastructures in general (Milne, 2007). But the analysis here suggests that the tension would not go away with a few path-breaking innovations in the sector, since it concerns more fundamentally the paradox that liquidity is not a predicate of single assets, but a relationship between different assets that must be procured via 'market integration', which is itself a service of centralisation and ultimately monopolisation, contradicting the competitive condition of efficiency that motivated it at the outset.[6]

6. The 'Sovereign' of Liquidity

The 'sorting out' of the repo networks by creating an integrated system is not the only difficulty addressed by the global custodians' triparty systems. Indeed, I argue, they serve a kind of 'sovereign' function as well in securing the liquidity (in the double sense) of collateral – a role which resembles, at least in an abstract sense, the role of states as 'sovereigns' in financial markets. Traditionally, so-called 'sovereign' bonds – that is, government debt – have been the primary source of high-quality safe assets used as collateral because it is generally unlikely that states default on their loans, at least that EU member states would do so. But in the wake of the financial crisis, some EU member states came under so much pressure that their status as debtors was downgraded by the major international credit rating agencies – Greek sovereign debt was even downgraded to 'junk', meaning that it was effectively useless as collateral, as not even European central banks were allowed to accept it.[7] In other words, liquidity 'dried up' for security (not velocity) reasons, exposing the implicit state guarantee underlying the entire financial system and its potential flaws. What is less often noted is

that this guarantee is not founded on the mere credit status of states alone, as if they were market players like everybody else, but also concerns their role as regulators of the very markets that they themselves depend on for credit. Moreover, there is a certain way – even if only so in a very abstract sense – in which the frictionless space of perfect liquidity where 'nothing moves' created by the global custodian bank resonates with the role of the state in contemporary finance.

Despite the well-known trends within recent decades that have moved in the opposite direction (separation of fiscal and monetary policy, withdrawal of government from many forms of economic activity and investment, deregulation of financial markets) new close state-market relationships have also emerged in finance (Braun and Hübner, 2018; Braunstein, 2017; Gabor and Ban, 2016). States are in a special position to remove risk from liquidity employing a number of techniques and regulations across the otherwise separate fields of collateral management and government debt (see also Gabor, 2016; Gabor and Ban, 2016). I refer to this capacity as 'sovereignty', not over a territory and a population, in this case, but over a market in which an agent is engaged, in particular with regards to 'solving' the intrinsic contradiction of liquidity. Removing risk from market exchange and buttressing liquidity is the imposition of a certain governance framework on bilateral exchanges that is not external to those exchanges as mere 'intervention' or 'regulation', but itself a part of them. It is necessary to think of sovereignty not exclusively in terms of the state, but rather as a liquidity-guaranteeing force *within* markets, related to the 'inherent hierarchy' of money and finance (Mehrling, 2013). The parallel between the global custodian bank and the sovereign state is a conceptual one in so far as they both are not simply the providers of infrastructures and regulation, but at the same time the frame-condition for the establishment of efficient markets through the buttressing of liquidity and the guarantors against the manifestation of the intrinsic contradiction of liquidity.

From this perspective, it becomes important not only to appreciate the 'sovereign' aspects of certain major financial institutions such as global custodian banks, but also, reversely, to appreciate states as 'sovereigns' *in* the market. In section 4, I explained that government bonds – or 'sovereign debt' – is the predominant kind of asset to be used as 'high-quality liquid' collateral. In this section, we shall see that this is not simply due to governments being generally regarded as safe debtors. States are able to buttress the market liquidity of their debt in various ways that are not open to others, including regulation. These techniques contribute towards the status of government debt as both a strong guarantee of security *and* a highly liquid commodity. The state is a 'sovereign' standing with one leg in the market and one leg outside it, straddling the contradiction of collateral between security and commodity. One example is the 'primary dealer' system, discussed in detail in subsection 6.1.

6.1. The primary dealer system and regulation as instances of state sovereignty

The primary dealer system originally comes from the US. The French central bank embraced the primary dealer system with enthusiasm while the German central bank has been much more reluctant (Gabor, 2016). Officially, Germany does not have a primary dealer system, although central bankers I interviewed explained that there are many similarities. For example, while the Bundesbank's sovereign debt auctions are in principle open to all banks, they require acceptance according to certain criteria and newly issued government bonds are only sold in portions of €1 m., that is, de facto to bigger institutions (cf. Deutsche Bundesbank, 2015).

In general, to become a primary dealer, a bank must fulfil certain criteria – the main concern being its ability to assure the liquidity of the government bonds in the 'secondary market'. Indeed, there is not one, but two markets in government debt: one in which a short list of big banks bid for the bonds as they are issued and one in which the bonds circulate between investors in what we usually understand as 'the market.' Both markets are governed so as to create and maintain liquidity

and to keep the price of borrowing (interest rates) low for the state. The primary dealers are thus 'market makers' in government bonds in the secondary market. Their number varies: from about 10 in Denmark, over about 20 in France, to about 30 in Germany (see AFME, 2015; see also Agence France Trésor, 2016; Deutsche Bundesbank, 2016; Nationalbanken, 2015). Many are international banks, often based in London (Gabor, 2016).

In return for their privileged access, the primary dealer banks are contractually obliged to bid at all the auctions: 'The Treasury is very keen on that all participants bid on all lines', as one central banker explains. The primary dealers are monitored, their statute reviewed, and the list of institutions revised every year. The primary dealers are even obliged to bid within a specific price range and to have a permanent offer with low 'spreads' between their bid (buy) and ask (sell) prices. A Danish primary dealer explains:

> We have various obligations that are decided in dialogue with the issuers [the Treasury or central bank]. For instance, we agree to be active from 8 AM to 4 PM with a 10 øre [~1.5 cent] bid-offer spread on certain platforms [i.e., secondary markets] to maintain a certain level of [price] information and liquidity [in the market]. Then we meet regularly with the other primary dealers and the issuers … to discuss whether everything works out, or if there are some things to be improved.

The primary dealer system is first of all a way for governments to borrow cheaply. Since in financial markets price is very much a reflection of risk, what governments do with the primary dealer system is to create a framework that obliges certain major banks to keep buying and selling within a pre-set range of prices. They do so in an attempt to guarantee market liquidity even at moments when banks have no direct financial incentive to do so (their interest, the interviewee above explains, lies more in

the market position and client access that comes with being a primary dealer, than with direct revenues from being one). With market liquidity guaranteed, buyers of sovereign bonds in the secondary market know that they can at any time – even in times of market stress or crisis – sell or buy high quality collateral according to their liquidity needs without affecting prices too much. This guarantee, in turn, is one reason why governments can borrow at lower interest rates than most others. The primary dealer system, of course, is not the only factor contributing to this end, and it is far from perfect in guaranteeing market liquidity, as became clear with the credit downgrading of several EU member states following the financial crisis. Indeed, the fundamental point about liquidity is that it is a *problem* because it warrants a guarantee without being able to provide a perfect one, since that guarantee must be given in terms of the competitive valuation of scarce assets in a market. But the system is not passive to such pressures either. For example, in times of market stress there will be extraordinary meetings in order to agree to widen the bid-offer spread as a way of protecting the dealers against increased volatility, or to decrease mandatory trading volumes for a while. The system certainly contributes towards a liquidity guarantee, as one central banker explains:

> It allows you to go to the investors and say: 'There is a calendar and there is always someone there if you want to buy or sell.' It is all about being extremely predictable … in order to reassure the investors that come to see you. The fear of the investor is to not be able to resell.

The term 'predictable' is key here – it is the opposite of 'risk'. Guaranteeing liquidity means removing risk, and removing risk means guaranteeing liquidity. In the perfect scenario, prices on government bonds fall to the absolute market minimum, corresponding to zero risk. The power of states to shape the qualities of their debt in financial markets (its liquidity, risk profile, and price) is quite striking upon closer inspection, even if it is not perfect or, rather, paradoxical.

Speaking of the unexpected and indeed very puzzling phenomenon of negative interest rates on some government bonds in the wake of the financial and economic crisis, one central banker from a monetary policy back-office explains:

> Today, for example, in Germany and France [the price of government debt] of less than one year … is negative, you pay to have the debt. For the state that is pretty interesting, after all. … I was with the government debt office at the time [when interest rates turned negative] – we were really surprised by the negative rates, we did not understand it. … We even called the primary dealers to ask if it was not a mistake! I do not see the economic interest in doing that. … The only reason I can find is the solvency ratios [i.e., regulation of the 'safe asset' buffers that banks must hold] because there is not that much high-quality debt around. So you buy it to not be penalised.

The so-called 'flight to quality' where banks prefer to lend to the German state at low rates of interest over lending to the Greek state at high interest rates at a substantial default risk does not in itself explain why they do not simply hold cash instead of taking on negative interest rates. The interviewee suggests that regulation imposed by the governments themselves has the power to push the price of government debt below zero under certain circumstances, such as those we have been witnessing recently in Europe.

My claim here is that – despite the obvious differences separating them – both states and global custodians can be called 'sovereigns', not in the sense of controlling means of violence external to the market, but in a sense implicit to the market itself. The efficient market is ideally perfectly liquid, but where is that liquidity guarantee going to come from? Only agents who 'encompass' the market – either as 'regulators' or as 'monopolies' – can provide it. Yet, their guarantee will never be perfect

because they will simultaneously have to be *in* the market themselves, that is, dependent on the fluctuating valuations resulting from competitive transactions. The paradox of 'sovereignty', in this sense, is thus just a variation over that of 'liquidity'. These paradoxes manifest themselves as *practical* problems of velocity, security, liquidity, and sovereignty. Market agents mobilize economic theories – among other instruments – in their attempts to respond to those problems.

7. Collateral sovereignty and economic theory

Following the thread of problems from the 'Collateral is the New Cash' report over EU capital market integration, triparty repo systems and, finally, sovereignty in finance has not been a drifting astray from the initial inquiry. Looking closely at the latter topics, we recover problems of classic economic theory concerning the relationship between quantity and liquidity, but in new variants.

To begin with, note that the primary dealer system and the role of the state in guaranteeing the liquidity of its debt (and hence the function of that debt as collateral) resembles strikingly Georg Knapp's 'state theory of money'. Knapp conceptualized money not as the most liquid asset emerging from commodity exchange, but as based on a circuit of (a) the state issuing debt certificates in order to be able to make purchases in the market and (b) levying taxes in those very certificates (backed by state force against tax evaders) so as to create a general demand for them, hence (c) effectively imposing its debt as a medium of exchange (money) in the economy. In a more complex and less obvious way, states today govern the circulation, demand, and price of its own debt. Today, that debt has been divided between that of the central bank (cash) and that of the Treasury (government bonds, collateral), but the state is deeply involved in guaranteeing the exchangeability of the two in the market as well as their liquidity. Keynes' central argument – that the government can indebt itself in times of slump to create purchasing power and thereby expand economic activity – owes much to Knapp, as his argument relied on the state as the guarantor of ideally infinite credit liquidity.

However, it would be a mistake to simply proclaim Knapp (or modern versions of it, see Sgambati, 2016) the 'true' economic theory of contemporary finance. Rather, the intrinsic *contradiction* of sovereignty, being both dependent on the market and sovereign over it, is reflected in the *opposing* economic theories on the topic – Knapp's theory occupying just one *position* within that opposition. Monetarist theory was originally targeted against precisely the role of the state as sovereign in finance, but without escaping the fundamental problem. With its privileged capacity to create the money asset, Friedman and others argued, the state could abuse of this power and produce an even graver crisis than liquidity dry-up: inflation. Ultimately, in their view, money is a product of market exchange and any sovereign interventions (including monopoly formations) in the market will only impede efficiency in the long run. Fisher argued that while individuals can decide to indebt themselves, '[s]ociety as a whole cannot borrow or lend as an individual can,' but is constrained by the total supply of 'loanable funds', asserting that 'Society is like Robinson Crusoe picking and eating his berries' (Fisher, 2012: 500–501).

The problem should not be reduced to a binary opposition between Keynesianism and monetarism. Rather, the problem is dynamic in its complexity and allows for alternative positions to be formulated. One such alternative formulation points toward modern finance and the economic theories about it. The Capital Asset Pricing Model (CAPM) – first developed by Sharpe based on the work of Markowitz and Tobin in the second half of the twentieth century and soon to become a cornerstone of modern finance theory – theorises a situation of perfect liquidity in a market without a sovereign body (MacKenzie, 2006; Mehrling, 2012). In CAPM there is an exogenously given supply of securities of which, in equilibrium, 'everyone holds the market portfolio and adjusts risk exposure by borrowing or lending at the risk-free rate [of interest]' (Mehrling, 2012: 204). A situation, it is worth noting, resembling the perfectly liquid trading not in qualitatively different individual assets, but in baskets of assets with different risk profiles within the triparty system. In the CAPM

world, 'The optimal set of risky investments [is] simply the market itself' (MacKenzie, 2006: 56). CAPM thus takes a first step in a new direction where the quantities that count are not only those of commodities, capital and money, but also the 'quantity of risk' (Mehrling, 2012: 105). But CAPM maintains some traditional aspects of the Keynes-Monetarism debate because the quantity of risk is assessed based on an assumption of unrestrained access to credit at the 'riskless rate of interest,' corresponding to a zero-risk investment, proxied by US short-term government bonds (Treasury Bills) (Mehrling, 2012: 107, 115). In other words, while seemingly assuming a world without a sovereign, CAPM relies on one nonetheless – one that creates both infinite money and riskless financial assets.

Fischer Black, the mastermind of what Mehrling (2012) calls 'the revolutionary idea of finance,' pushed CAPM further (for example, by abandoning the need for a riskless asset and free credit, see Mehrling, 2012: 115), moving modern finance theory further away from academic economics. Black worked with Robert Merton and Myron Scholes on the theory of option valuation, but died too soon to receive the 'Bank of Sweden Prize in Economic Sciences in Memory of Alfred Nobel' (often erroneously called the Nobel Prize in economics, which does not exist) along with them in 1997. Black also worked as an intellectual and theoretician of finance at the margins of academia, for example, while employed at Goldman Sachs. Many of his unpublished and ignored papers have been (re-)published and received thorough attention only after his death in 1995 (Black, 2009 [1987], 2010a [1995]; Mehrling, 2012 [2005]). In one unpublished, but lucid note on the 'fundamentals of liquidity,' Black (1970) provides an early vision of what would later become the bread and butter of modern finance. Here, Black claims that there is no reason why the liquidity of an asset should influence its expected return. Ordinary economic logic would have that if an asset cannot easily be re-sold, it is riskier and hence should carry a higher return to compensate for that risk (cf. section 6). There may presently be 'institutional constraints' actually causing one or another trade-off between liquidity and return, Black suggests, but lack of liquidity can always be circumvented in the following

way: Because a seller can provide the buyer with credit for the sale, or borrow from the buyer in advance of the sale, there is 'virtually no relationship between the legal transaction' of a sale and 'the settlement of the transaction in the form of one or more cash flows' (Black, 1970: 3). In other words, both the buyer and the seller can organize their cash flows to occur conveniently and without relation to the time of the sale (Black, 1970: 3). More fundamentally, this means that the two functions of financial assets (according to Black), store of wealth and transfer of risk, 'are separable' (Black, 1970: 4).

> Thus a long term corporate bond could actually be sold to three separate persons. One would supply the money for the bond; one would bear the interest rate risk; and one would bear the risk of default. The last two would not have to put up any capital for the bonds, although they might have to post some sort of collateral. (Black, 1970: 5).

This intuition developed into what Mehrling et al. (2015: 83) describe the situation of modern international finance where securities can be hedged, generically speaking, by three types of 'swaps' controlling the risks of credit default, interest rate volatility, and foreign exchange volatility, respectively, 'so that the combined … [investor] asset position is essentially riskfree.'

Black's addition that those who bear interest rate and default risk 'might have to post some sort of collateral' is crucial here because two key lessons from the 2008 financial crisis were that uncollateralized lending and intransparent repo chains created systemic risk in this system. Indeed, these lessons motivated the regulation that entailed the discussion about collateral shortages and the quantity theory of collateral, as we have seen. So collateral takes the centre stage in the Blackian world of modern finance.

Black's world is one of generalized sovereignty in the sense that there is no sovereign body (states) or bodies (such as custodian banks), since every individual is a sovereign capable of

separating risk and liquidity through what has become known as swap and derivatives contracts (in practice, such contracts are far too complex and expensive for ordinary individuals to engage in, but this does not seem to concern Black). Black reverses economic theory and the debate between Keynesians and Monetarists fundamentally by not moving from a world of commodities to a problem of sovereignty, but (as the true libertarian that he was) from the sovereignty of the individual to commodities that turn out to be nothing but different risk profiles, at least from a financial perspective. The problems of the state and of liquidity seemingly disappear because individuals can now create their own liquidity at will: credit is always an option. Except 'they might have to post some sort of collateral,' and so *collateral* must be not only perfectly liquid in the traditional sense but also actually perform the function of perfect risk transfer.

Crucially, Black's conception of equilibrium here is different from the neo-classical one where it is the (long-term) situation of stable prices in a market and the optimal equilibrium results from a situation with no 'frictions' to competition and transactions (see Arrow and Debreu, 1954). For Black, equilibrium is a situation where there are 'no opportunities to make abnormal profits' (Black, 2010b [1987]: xxi). Yet, the underlying *problem* is the same as in economic theory, albeit reversed: the relationship between commodities, liquidity and the 'sovereign' function of making commodities liquid. Black transposed the problem onto a new level, that of risk, but did not eliminate it. The Blackian world ideally requires unlimited access to a collateral asset that can *immediately* be transferred (where other assets may be less liquid) and perform the function of *eliminating risk* (while all financial assets are per definition risky). T2S, the primary dealer systems, collateral re-use and the triparty systems can all be seen as different responses to this problem. None of them are perfect, of course, but the specific flaws of the systems are not the primary interest here.

8. Conclusion: 'It Depends on What you Mean by "Cash"'

The article set out to study the ways in which financial practitioners epistemically deal with recent changes in the role of collateral in contemporary finance. Specifically, I asked why and how otherwise abandoned quantity theory has re-emerged as an explanatory model in the field. I have argued that the re-emergence reflects the inherently contradictory character of liquidity in contemporary finance and the great shift towards scarcity and risk following the 2008 crisis. On the one hand, liquidity denotes the exchangeability of a single asset in bilateral trade; on the other hand, it denotes the integration of the market as a whole. From the first perspective, a scarce commodity can assume the function of a medium of exchange, that is, money. From the latter perspective, a liquidity guarantee is required, presupposing the existence of a 'sovereign' agent in the market that creates a frictionless space for transactions with infinite fungibility of assets and cash (credit). The contradiction of liquidity used to be associated primarily with money, but has become related to collateral because credit creation in Europe today is almost synonymous with collateralization. The slogan 'collateral is the new cash' and its rooting in quantity theory must be understood on this background. Moreover, the slogan exemplifies how the epistemic problem emerges in financial market practices and becomes visible through practitioners' mobilization and formulation of economic theory in their attempt to respond to practical problems of buttressing liquidity, velocity and security.

Tellingly of the contradictory character of liquidity, when confronted with the slogan 'collateral is the new cash', one central banker was first puzzled, but then he settled: 'Well, it depends on what you mean by "cash," but it is true, yes'. This does not mean that quantity theory is to be elevated to the 'true' representation of contemporary finance. Rather, it re-emerges as one response to the contradiction and problem of liquidity – a response that tackles the commodity aspect of a finite quantity, which has moved to the fore since 2008. A correct description of the problem of liquidity is only captured by economic theory in the opposition of quantity theory to competing theories

(responses) based on the perfect liquidity of frictionless credit. The interesting thing here about these opposing economic theories is that they – not as individual 'true' or 'false' theories, but in their very opposition – neatly capture the contradiction between a finite quantity of a risky commodity (money, credit, or collateral) and an infinitely liquid and riskless medium of exchange (guaranteed by a 'sovereign'). The paradox is that, both in the case of triparty system and of states what unleashes liquidity also curbs and contains it within, thereby defining the limit outside which it becomes a scarce commodity, that is, the 'survival constraint' (Mehrling, 2013). It is this contradiction that economic theory seems not to have been able to get hold of – perhaps due to its neo-positivistic creed to 'clear definitions' and 'coherence' strictly in terms of non-contradiction. What must be grasped is how the problem of liquidity is dynamically transposed across different levels of analysis: money, credit, collateral, risk, sovereignty. Even the very concept of 'the market' in economic theory seems to be central to the contradictory character of liquidity. On the one hand, the market is simply the place where commodities are exchanged; on the other hand, it is an ideal notion of a fully integrated space where perfect liquidity and fungibility means that exchange can happen as easily as if 'nothing moves'.

The analysis suggests a possible new research agenda concerning the relationship between economic theory and economic markets. Where economists have debated which of their theories is correct, sociologists have traditionally argued that economic theory is simply a wrong depiction of socially constructed market realities. Political economists have generally (but not exclusively) tended towards the view that ideas and theories reflect interests, while performativity studies have argued that economic theory plays a co-constitutive role in the creation of markets. But the analysis presented here does not fit easily with any of these views. Economic theory is mobilized in financial practice in the attempt to respond to a number of fundamental problems, and contradicting theories continue to re-emerge, albeit always in new variants, in response to new situations, precisely because they cannot

resolve the fundamental problem. To the extent that one can speak of economic theory (both academic and in practice) being correct, it is so not by virtue of its theoretical propositions, but to the extent that opposing economic theories neatly represent the problem of 'liquidity' and 'the market' on which economic theory itself builds – precisely by virtue of their mutually contradictory propositions.

Notes

[1] Regulation includes notably Basel-III/CRD-IV on risk-weighted assets, leverage ratios, and liquidity rules, EMIR requirements to over-the-counter derivatives clearing margins, AIMFD, and UCITS-V.

[2] For eligible assets, European central banks apply haircuts as high as 65 %, meaning that assets worth 165 must be pledged in order to release credit worth 100.

[3] Typing slightly modified.

[4] That is, into the number of collateral pledges or repos multiplied the average credit obtained from the collateral. The value of the collateral must include haircuts and fees, not just the value of the credit line obtained (Gorton and Metrick, 2012: 428).

[5] Securities lending is also used for speculative short selling and tax-evasion purposes ('coupon washing').

[6] T2S is a special and complex, but interesting case of centralisation by the ECB, treated in detail elsewhere (Krarup, 2019a).

[7] This could only happen because of the constitutional 'independence' of European central banks from their national governments.

References

AFME (2015) *European Primary Dealers Handbook*. Q4 2015. Association for Financial Markets in Europe.

Agence France Trésor (2016) Primary Dealers List. Available at: http://www.aft.gouv.fr/articles/liste-des-svt_96.html (accessed 24 March 2016).

Arrow K and Debreu G (1954) Existence of an Equilibrium for a Competitive Economy. *Econometrica* 22(3): 265–290.

Bank of England (2014) Money creation in the modern economy. *Quarterly Bulletin* 2014(1): 15–27.

Black F (1970) Fundamentals of Liquidity. Unpublished memo. University of Chicago Graduate School of Business. Available at: https://speculativematerialism.files.wordpress.com/2013/06/fischer-black-fundamentals-of-liquidity-19701.pdf (accessed 31 March 2016).

Black F (2009) *Business Cycles and Equilibrium*. Updated Edition. Hoboken, N.J: John Wiley & Sons.

Black F (2010a) *Exploring General Equilibrium*. Cambridge: MIT Press.

Black F (2010b) Introduction. In: *Business Cycles and Equilibrium*. Cambridge: Wiley, pp. xxi–xxvi.

Braun B (2014) Why Models Matter: The Making and Unmaking of Governability in Macroeconomic Discourse. *Journal of Critical Globalisation Studies* 1(7): 48–79.

Braun B (2015) Governing the future: The European Central Bank's expectation management during the Great Moderation. *Economy and Society* 44(3): 367–391.

Braun B (2016) Speaking to the people? Money, trust, and central bank legitimacy in the age of quantitative easing. *Review of International Political Economy*.

Braun B and Hübner M (2018) Fiscal fault, financial fix? Capital Markets Union and the quest for macroeconomic stabilization in the Euro Area. *Competition & Change* 22(2): 117–138.

Braunstein J (2017) The domestic drivers of state finance institutions: evidence from sovereign wealth funds. *Review of International Political Economy* 24(6): 980–1003.

Callon M (1998) *Laws of the Markets*. Oxford: John Wiley & Sons.

Clearstream and PWC (2013) *The 300-billion-euro Question: Survey on the Benefits of TARGET2-Securities*. August. Frankfurt: Deutsche Börse Group.

de Long B (2000) The Triumph of Monetarism? *Journal of Economic Perspectives* 14(1): 83–94. DOI: 10.1257/jep.14.1.83.

Deutsche Bundesbank (2015) *Verfahrensregeln für Tender bei der Begebung von Bundesanleihen, Bundesobligationen, Bundesschatzanweisungen und Unverzinslichen Schatzanweisungen des Bundes*. Deutsche Bundesbank.

Deutsche Bundesbank (2016) *Members of the Bund Issues Auction Group*. 1 January. Deutsche Bundesbank.

Duffie D (2015) Financial market infrastructure: A challenge to the supervision and regulation of the financial system. In: Claessens S, Evanoff D, Kaufman G, et al. (eds) *Shadow Banking within and across National Borders*. Claessens et al. London: World Scientific, pp. 279–285.

ECB (2007) *The securities custody industry*. Occasional Paper Series 68. Frankfurt: European Central Bank. Available at: https://www.ecb.europa.eu/pub/pdf/scpops/ecbocp68.pdf?5ff757225862fdd1894d8dab08815b19 (accessed 6 December 2015).

Engelen E and Glasmacher A (2018) The waiting game: How securitization became the solution for the growth problem of the Eurozone. *Competition & Change* 22(2): 165–183.

Epstein R and Rhodes M (2018) From governance to government: Banking union, capital markets union and the new EU. *Competition & Change* 22(2): 205–224.

European Commission (2015) *Green paper: Building a Capital Markets Union*. COM(2015) 63 final. Brussels: European Commission.

Federal Reserve Bank of New York (2008) The Money Supply. Available at: http://www.newyorkfed.org/aboutthefed/fedpoint/fed49.html (accessed 10 April 2015).

Fender I and Lewrick U (2013) Mind the Gap? Sources and Implications of Supply-Demand Imbalances in Collateral Asset Markets. *BIS Quarterly Report* 2013(September): 67–81.

Fisher I (2009) *The Purchasing Power of Money*. Michigan: University of Michigan Library.

Fisher I (2012) *The Theory of Interest as Determined by Impatience to Spend Income and Opportunity to Invest It*. Mansfield: Martino Fine Books.

Gabor D (2016) The (impossible) repo trinity: the political economy of repo markets. *Review of International Political Economy* 23(6): 967–1000.

Gabor D and Ban C (2016) Banking on Bonds: The New Links Between States and Markets. *Journal of Common Market Studies* 54(3): 617–635.

Gabor D and Vestergaard J (2018) Chasing unicorns: The European single safe asset project. *Competition & Change* 22(2): 139–164.

Garbade K (2006) The Evolution of Repo Contracting Conventions in the 1980s. *Economic Policy Review of the Federal Reserve Bank of New York* 12(1): 27–42.

Gorton G and Metrick A (2012) Securitized banking and the run on repo. *Journal of Financial Economics* 104(3). Market Institutions, Financial Market Risks and Financial Crisis: 425–451.

ICMA (2011) Global Master Repurchase Agreement (GMRA).

ICMA (2012) *Collateral Fluidity*. International Capital Market Association (ICMA).

ICMA-ERC (2014) *Collateral is the new cash: the systemic risks of inhibiting collateral fluidity*. International Capital Market Association (ICMA) European Repo Council (ERC).

Knorr-Cetina K (1999) *Epistemic Cultures: How the Sciences Make Knowledge*. Cambridge: Harvard UP.

Krarup T (2019a) Between Competition and Centralization: The New Infrastructures of European Finance. *Economy and Society*: 1–20. DOI: 10.1080/03085147.2019.1578064.

Krarup T (2019b) German Political and Economic Ideology in the Twentieth Century and its Theological Problems: The Lutheran Genealogy of Ordoliberalism. *European Journal of Cultural and Political Sociology*. DOI: 10.1080/23254823.2018.1559745.

Krippner GR (2012) *Capitalizing on Crisis*. Cambridge: Harvard University Press.

MacKenzie D (2006) *An Engine, Not a Camera: How Financial Models Shape Markets*. Cambridge: MIT Press.

Mehrling P (2012) *Fischer Black and the Revolutionary Idea of Finance*. Hoboken: John Wiley & Sons.

Mehrling P (2013) The Inherent Hierarchy of Money. In: Taylor L, Rezai A, and Michl T (eds) *Social Fairness and Economics : Economic Essays in the Spirit of Duncan Foley*. Routledge, pp. 394–404.

Mehrling P, Pozsar Z, Sweeney J, et al. (2015) Bagehot was a Shadow Banker. In: *Shadow Banking Within and Across National Borders*. Claessens et al. London: World Scientific, pp. 81–98.

Millo Y, Muniesa F, Panourgias NS, et al. (2005) Organised detachment: Clearinghouse mechanisms in financial markets. *Information and Organization* 15(3): 229–246.

Milne A (2007) Competition and the rationalisation of European securities clearing and settlement. In: *The Structure of Financial Regulation*. Mayes & Wood. New York: Routledge, p. chapter 12.

Mirowski P and Plehwe D (2009) *The Road from Mont Pelerin: The Making of the Neoliberal Thought Collective*. Cambridge MA: Harvard University Press.

Nationalbanken (2015) Primary dealers. Available at: http://www.nationalbanken.dk/en/governmentdebt/Secondarytradingandmarketmaking/Pages/Primary-dealers.aspx (accessed 3 February 2015).

Pozsar Z, Adrian T, Ascraft A, et al. (2013) Shadow Banking. *Economic Policy Review of the Federal Reserve Bank of New York* 19(2): 1–16.

Preunkert J (2017) Financialization of government debt? European government debt management approaches 1980–2007. *Competition & Change* 21(1): 27–44.

Riles A (2010) Collateral Expertise: Legal Knowledge in the Global Financial Markets. *Currrent Anthropology* 51(6): 795–818.

Riles A (2011) *Collateral Knowledge: Legal Reasoning in the Global Financial Markets*. University of Chicago Press.

Seabrooke L and Tsingou E (2014) Distinctions, Affiliations, and Professional Knowledge in Financial Reform Expert Groups. *Journal of European Public Policy* 21(3): 389–407.

Sgambati S (2016) Rethinking banking. Debt discounting and the making of modern money as liquidity. *New Political Economy* 21(3): 274–290.

Singh M (2013) *Collateral and Monetary Policy*. IMF Working Papers WP/13/186. International Monetary Fund.

Singh M (2015) Collateral: Cross-Border Issues. In: *Shadow Banking Within and Across National Borders*. Claessens et al. London: World Scientific, pp. 373–392.

Stein JC (2015) The Fire-Sales Problem and Securities Financing Transactions. In: *Shadow Banking Within and Across National Borders*. Claessens et al. London: World Scientific, pp. 3–16.

Sweeney R (2017) Global banks or global investors? The case of European debt flows. *Competition & Change* 21(5): 364–387.

Terol I (2013) T2S: Increasing the Velocity of Collateral Circulation. *T2S Online* 16: 9–10.